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Review: Fiddler Crabs of the World by Jocelyn Crane

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Reviews:

Jocelyn Crane, **Fiddler Crabs of the World.** Ocypodidae: Genus *Uca.* XXIV + 737 pp., 369 photographs, 101 figures, 21 maps. ISBN 08102-6, Princeton University Press, Princeton, New Jersey, 1975. $75.00.

In this large and comprehensive monograph, Crane presents an exhaustive study of the morphology, social behavior, and evolution of fiddler crabs. Nearly all pertinent literature prior to the early 1970's is covered and cited.

The book is divided into two main sections. The first section deals with systematics and discusses sixty-two different species of *Uca* representing nine subgenera, seven of which are described as new. It also includes a discussion on systematic uncertainties within the group. The second section covers zoogeography, ecology, structure and function, nonsocial activities, social behavior, territoriality, functions of combat and display, origins of social patterns, speciation, phylogeny and trends of evolution.

The appendix includes keys to the genera of Ocypodinae, subgenera of *Uca,* and species in various parts of the world. Tables giving such information as characteristics of the subgenera and subspecies, distributions, variations of morphological characters, and social behavior are also included in the Appendix. Field methods and the maintenance of fiddlers in captivity are also discussed.

This volume undoubtedly is the most comprehensive and important work on the genus yet published; however, as pointed out by Hagen (1976, *Crustaceana* 31(2):221-224), some regretable complications in the systematics of the group have occurred. While Crane's book was being prepared for publication, which apparently took several years, Bott (1973, Senckenbergiana Biol. 54:315-325) split the genus *Uca* into ten genera. As a result of Bott's publication, five of Crane's subgenera apparently became junior synonyms, leaving only *Australuca* Crane and possibly *Afruca* Crane as valid. Hagen gives an excellent discussion of the taxonomic and systematic problems resulting from Bott's and Crane's works and concludes that "for the present the best solution would be to avoid the confused and clumsy formal subgeneric or even generic splitting and adhere to the familiar use of plain *Uca.*"

Regretably, Crane's monograph will be of only limited aid in the identification and characterization of the species of *Uca* occurring along the northeastern Gulf of Mexico, and the remainder of this review will focus on that portion of the monograph associated with this region and its problems. *Uca panacea* Novack and Salmon, 1974, a species closely related and morphologically similar to the sand fiddler, *U. pugilator,* was described from the northern Gulf of Mexico while Fiddler Crabs of the World was in press and thus was not treated. *Uca panacea* and *U. pugliator* have overlapping ranges in west Florida. *Uca pugilator's* apparent western range limit is near Pensacola, Florida, whereas *Uca panacea's* range extends westward into Texas (Novack and Salmon, 1974, Proc. Biol. Soc. Wash. 87:313-326). *Uca longisignalis* and *U. virens,* described from the northern Gulf of Mexico, previously have been referred to as *U. pugnax* and/or *U. rapax* by earlier workers. Hagen (1976) examined the types of both *U. virens* and *U. longisignalis* and concluded that they were synonymous with *U. rapax* and *U. minax,* respectively. Studies by Thurman 1973 (unpublished M. S. Thesis, Univ. of West Fla.) support Hagen's synonymy of *U. minax* with *U. rapax.* There are, however, differences in habi-

tat, coloration, and minor morphological characters between *U. minax* and *U. longisignalis* (Thurman, 1973; Heard and Stewart, unpublished observations). These differences suggest that the synonymy of *U. longisignalis* with *U. minax* at this time would be premature. In fact, there are some interesting, though subtle, differences in coloration between the Atlantic and Gulf populations of *U. minax* that warrant further study. *Uca minax* is generally confined to areas of low salinity, especially the oligohaline tidal marsh areas at the mouths of rivers. *Uca longisignalis*, a much smaller species, usually occurs in the muddy areas of mesohaline *Spartina-Juncus* salt marshes, the same general type of habitat occupied by *U. pugnax* on the Atlantic east coast.

Crane treats *U. speciosa* as a subspecies of *U. spinicarpa*; however, in the northeastern Gulf these two forms have widely overlapping ranges along several hundred miles of coastline and appear to occur, generally, on different kinds of substrates (Thurman, 1975; Heard, unpublished observations). *Uca spinicarpa* usually burrows in firm clay-mud areas, where as *U. speciosa*, a distinctly smaller form, generally burrows in coarse sand or sand-mud substrates in higher salinity areas. Although they are closely related, there are distinct morphological differences, especially in major chela of the male, between the two forms. These observations, many of which were not available to Crane, support the recognition of *U. speciosa* as a distinct species. Tentatively the following species of *Uca* should be recognized as occurring along the coast of the northeastern Gulf of Mexico: *U. longisignalis* Salmon and Atsaides, 1968; *U. minax* (Le Conte, 1855); *U. panacea* Novack and Salmon, 1974; *U. pugilator* Bosc, 1802; *U. speciosa* (Ives, 1891); *U. spinicarpa* Rathbun, 1900; *U. virens* Salmon and Atsaides, 1968.

It is obvious that the species and species complexes of *Uca* in the northern Gulf will need much more careful ecological study before a clear understanding of their taxonomic and systematic relationships can be achieved. Although for the reasons given, Crane's monograph could not treat the northeastern Gulf species adequately, it does, based on the author's excellent studies in other regions, furnish the principles, techniques, and guidelines to approach the problem properly. Fiddler Crabs of the World will certainly become a classic in the field of carcinology. It is strongly recommended to marine and estuarine biologists, especially those working in the ecology, systematics and behavior of decapod Crustacea.

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